

What is claimed is:

1. An automatic pricing method for setting prices of items that are marketed in a web marketing system that performs electronic commerce on a network, comprising steps of:

5. at each point in time, carrying out marketing for fixed time intervals using a price that is one step size higher than, and a price that is one said step size lower than, an optimal price estimate at that time;

10 comparing profits obtained as a result of said marketing;

updating the optimal price estimate at time in question in a direction of price at which greater profit was obtained; and

15 repeating said marketing step, said comparison step, and said updating step.

2. An automatic pricing method according to claim 1 wherein said step size is determined by raising the number of past marketing time intervals to minus α power, where α is a positive number that is less than 1.

3. An automatic pricing method for setting prices of items that are marketed in a web marketing system that performs electronic commerce on a network, comprising the steps of:

5 (i) calculating, at each point in time, a price for each item by using both a weight vector obtained by adding a step vector that is generated randomly or pseudo-randomly to estimate of an optimal weighting vector at that time, and a weight vector obtained by subtracting
10 said step vector from the estimate of said optimal weight vector;

(ii) conducting marketing for fixed time intervals using said calculated prices;

(iii) comparing profits obtained as a result;

15 (iv) updating the estimate of the optimal weight vector at the time in question for each item is updated toward price at which higher profit was obtained; and

(v) repeating the steps (i) to (iv);

wherein set price of each item is calculated as
20 inner product of the weight vector for each item and an attribute vector of the item.

4. An automatic pricing method according to claim 3 wherein the size of said step vector is determined by raising the number of past marketing time intervals to a minus α power, where α is a positive number that is less
5 than 1.

5. A display item determination method for selecting items that should be displayed from among a multiplicity of sales items in a web marketing system that

performs electronic commerce on a network, comprising the
5 steps of:

carrying out an automatic pricing method according
to claim 3; and

selecting and displaying a fixed number of items
that maximize an evaluation value which is higher amount
10 of profit of profits that were obtained at two sales
prices at each point in time and for each item, said two
sales prices being adopted at preceding time point.

6. A display item determination method according to
claim 5 wherein:

at each point in time, the expected profit for each
item among a partial aggregate that is composed of a fixed
5 number of elements among aggregate items of all sales
objects is a sum of profit amounts of the two sales prices
adopted at the preceding point in time; and

a partial aggregate that approximately maximizes a
weighted sum of sums of expected profits for all items of
10 said partial aggregate and an index that indicates
variation between item attribute vectors of all items of
said partial aggregate is selected and items that should
be displayed are determined.

7. A method of determining items to display
according to claim 6 wherein a sum of Hamming distances
between pairs of all item attribute vectors of a partial

aggregate is used as the index that indicates variation of
5 the item attribute vectors of items in a partial aggregate.

8. An automatic pricing device for setting prices
of items that are marketed in a web marketing system that
performs electronic commerce on a network, comprising:

input means for receiving item information and
5 marketing information that includes marketing history in
the web marketing system from said web marketing system;
item information storage means for storing received
item information;

marketing history data storage means for storing
10 received marketing information;

automatic price calculation means that refers to
item information stored in said item information storage
means and marketing information stored in said marketing
history data storage means, updates prices of said items,
15 and outputs a result as price information; and

output means for transmitting said outputted price
information to said web marketing system;

wherein said automatic price calculation means
repeats, at each point in time, outputting of said price
20 information such that marketing is performed for fixed
time intervals at each of a price that is one step size
higher than an optimal price estimate at that time and a
price that is one said step size lower than said optimal
price estimate; comparison of profits that are obtained as

25 a result of said marketing; and updating of the optimal price estimate at that time in a direction of price at which higher profit was obtained.

9. An automatic pricing device for setting prices of items that are marketed in a web marketing system that performs electronic commerce on a network, comprising:

input means for receiving item information and
5 marketing information that includes marketing history in the web marketing system from said web marketing system;

item information storage means for storing received item information;

marketing history data storage means for storing
10 received marketing information;

automatic price calculation means that refers to item information stored in said item information storage means and marketing information stored in said marketing history data storage means, updates prices of said items,
15 and outputs a result as price information; and

output means for transmitting said outputted price information to said web marketing system;

wherein said automatic price calculation means repeats calculation of set price of each item as inner
20 product of a weight vector of each item and an attribute vector of the item; calculation, at each point in time, of a price for each item by using both a weight vector obtained by adding a step vector that is generated

randomly or pseudo-randomly to estimate of an optimal
25 weight vector at that time, and a weight vector obtained
by subtracting said step vector from the estimate of said
optimal weighting vector; outputting of said calculated
price as said price information; comparison of profits
that are obtained as a result; and updating of the
30 estimate of the optimal weighting vector for each item at
that time in a direction of price at which higher profit
was obtained.

10. A device for automatic pricing and display item
determination for setting prices of items that are
marketed in a web marketing system that performs
electronic commerce on a network and for determining items
5 to display in said web marketing system; comprising:

input means for receiving item information and
marketing information that includes marketing history in
the web marketing system from said web marketing system;

10 item information storage means for storing received
item information;

marketing history data storage means for storing
received marketing information;

automatic price calculation means that refers to
item information stored in said item information storage
15 means and marketing information stored in said marketing
history data storage means, updates prices of said items,
and outputs a result as price information;

item display means that refers to item information stored in said item information storage means and
20 marketing information stored in said marketing history data storage means, determines items to display in said web marketing system, and outputs a result as item display information; and

output means for transmitting said outputted price
25 information and item display information to said web marketing system;

wherein said automatic price calculation means repeats calculation of set price of each item as inner product of a weight vector of each item and an attribute
30 vector of the item; calculation, at each point in time, of a price for each item by using both a weight vector obtained by adding a step vector that is generated randomly or pseudo-randomly to estimate of an optimal weight vector at that time, and a weight vector obtained
35 by subtracting said step vector from the estimate of said optimal weight vector; outputting of said calculated price as said price information; comparison of profits that are obtained as a result; and updating of the estimate of the optimal weight vector estimate for each item at that time
40 in a direction of price at which higher profit was obtained; and

wherein said item display means, at each point in time, uses the higher of the profit amounts for two sales prices that were adopted at a previous point in time as an

45 evaluation value for each item to select a fixed number of
items that maximize said evaluation value and outputs a as
item display information.

11. A recording medium that can be read by a
computer and that stores a program for causing said
computer to execute an automatic pricing method for
setting prices of items that are marketed in a web
5 marketing system that performs electronic commerce on a
network, said method comprising the steps of:

at each point in time, carrying out marketing for
fixed time intervals using a price that is one step size
higher than, and a price that is one said step size lower
10 than, an optimal price estimate at that time;

comparing profits obtained as a result of said
marketing;

updating the optimal price estimate at time in
question in a direction of price at which greater profit
15 was obtained; and

repeating said marketing step, said comparison step,
and said updating step.

12. A recording medium that can be read by a
computer and that stores a program for causing said
computer to execute an automatic pricing method for
setting prices of items that are marketed in a web
5 marketing system that performs electronic commerce on a

network, said method comprising the steps of:

(i) calculating, at each point in time, a price for each item by using both a weight vector obtained by adding a step vector that is generated randomly or pseudo-randomly to estimate of an optimal weighting vector at that time, and a weight vector obtained by subtracting said step vector from the estimate of said optimal weight vector;

(ii) conducting marketing for fixed time intervals using said calculated prices;

(iii) comparing profits obtained as a result;

(iv) updating the estimate of the optimal weight vector at the time in question for each item is updated toward price at which higher profit was obtained; and

(v) repeating the steps (i) to (iv);

wherein set price of each item is calculated as inner product of the weight vector for each item and an attribute vector of the item.

13. A recording medium that can be read by a computer and that stores a program for causing said computer to execute an automatic pricing method and an display item selecting method;

said automatic pricing method comprising the steps of:

(i) calculating, at each point in time, a price for each item by using both a weight vector obtained by adding

a step vector that is generated randomly or pseudo-
randomly to estimate of an optimal weighting vector at
that time, and a weight vector obtained by subtracting
said step vector from the estimate of said optimal weight
vector;

(ii) conducting marketing for fixed time intervals
using said calculated prices;

(iii) comparing profits obtained as a result;

(iv) updating the estimate of the optimal weight
vector at the time in question for each item is updated
toward price at which higher profit was obtained; and

(v) repeating the steps (i) to (iv);

wherein set price of each item is calculated as
inner product of the weight vector for each item and an
attribute vector of the item;

said display item selecting method comprising the
step of:

selecting and displaying a fixed number of items
that maximize an evaluation value which is higher amount
of profit of profits that were obtained at two sales
prices at each point in time and for each item, said two
sales prices being adopted at preceding time point.